CLAIMS

1. A method for manufacturing a thin film integrated circuit device comprising the steps of:

forming a peel-off layer over a substrate;

forming a base film over the peel-off layer;

forming a plurality of thin film integrated circuit devices over the base film;

forming a groove at a boundary between the plurality of thin film integrated circuit devices; and

introducing a gas or a liquid containing halogen fluoride into the groove, thereby removing the peel-off layer, thereby separating the plurality of thin film integrated circuit devices.

2. A method for manufacturing a thin film integrated circuit device comprising the steps of:

forming a peel-off layer over a substrate;

forming a base film over the peel-off layer;

forming a plurality of thin film integrated circuit devices over the base film;

forming a groove at a boundary between the plurality of thin film integrated circuit devices;

attaching a jig to an upper portion of the plurality of thin film integrated circuit devices;

introducing a gas or a liquid containing halogen fluoride into the groove, thereby removing the peel-off layer, thereby separating the plurality of thin film integrated circuit devices; and

removing the jig attached to the plurality of thin film integrated circuit devices.

3. A method for manufacturing a thin film integrated circuit device comprising the steps of:

forming a peel-off layer over a substrate;

forming a plurality of thin film integrated circuits over the base film;

forming a heat-resistant insulating film over the plurality of thin film integrated circuits, thereby forming the plurality of thin film integrated circuit devices;

forming a groove at a boundary between the plurality of thin film integrated circuit devices; and

introducing a gas or a liquid containing halogen fluoride into the groove, thereby removing the peel-off layer, thereby separating the plurality of thin film integrated circuit devices.

4. A method for manufacturing a thin film integrated circuit device comprising the steps of:

forming a peel-off layer over a substrate;

forming a base film over the peel-off layer;

forming a plurality of thin film integrated circuit over the base film;

forming a heat-resistant insulating film over the plurality of thin film integrated circuit, thereby forming the plurality of thin film integrated circuit devices;

forming a groove at a boundary between the plurality of thin film integrated circuit devices;

attaching a jig to an upper portion of the plurality of thin film integrated circuit devices;

introducing a gas or a liquid containing halogen fluoride into the groove, thereby removing the peel-off layer, thereby separating the plurality of thin film integrated circuit devices; and

removing the jig attached to the plurality of thin film integrated circuit devices.

5. A method for manufacturing a thin film integrated circuit device according to Claim 2 or Claim 4, wherein the jig is attached using an adhesive material whose adhesive force is reduced or lost by UV light irradiation.

6. A method for manufacturing a thin film integrated circuit device according to

Claim 3 or Claim 4, wherein the heat-resistant insulating film contains a material that has a skeletal structure including a bond of silicon and oxygen and includes at least hydrogen as a substituent or at least one selected from the group consisting of fluorine, an alkyl group, and aromatic hydrocarbon as the substituent.

7. A method for manufacturing a thin film integrated circuit device according to any one of Claims 1 through 4, wherein the peel-off layer contains silicon as a main component.

8. A method for manufacturing a thin film integrated circuit device according to any one of Claims 1 through 4, wherein the base film contains one selected from silicon oxide, silicon nitride, and silicon oxide containing nitrogen.

9. A method for manufacturing a thin film integrated circuit device according to any one of Claims 1 through 4, wherein the groove is formed by dicing or dry etching.

10. A method for manufacturing a thin film integrated circuit device according to any one of Claims 1 through 4, wherein the substrate is a glass substrate or a quartz substrate.

11. A method for manufacturing a thin film integrated circuit device according to any one of Claims 1 through 4, wherein the halogen fluoride is ClF_3 (chlorine trifluoride).

12. A method for manufacturing a noncontact thin film integrated circuit device comprising the steps of:

forming a peel-off layer over a substrate;

forming a base film over the peel-off layer;

forming a plurality of thin film integrated circuits over the base film;

forming a heat-resistant insulating film over the plurality of thin film integrated circuits, thereby forming a plurality of thin film integrated circuit devices;

forming a groove at a boundary between the plurality of thin film integrated circuit devices;

introducing a gas or a liquid containing halogen fluoride into the groove, thereby removing the peel-off layer, thereby separating the plurality of thin film integrated circuit devices; and

forming an antenna on an upper or lower portion of the plurality of thin film integrated circuit devices.

13. A method for manufacturing a noncontact thin film integrated circuit device comprising the steps of:

forming a peel-off layer over a substrate;

forming a base film over the peel-off layer;

forming a plurality of thin film integrated circuits over the base film;

forming a heat-resistant insulating film over the plurality of thin film integrated circuits, thereby forming a plurality of thin film integrated circuit devices;

forming a groove at a boundary between the plurality of thin film integrated circuit devices;

attaching a jig to an upper portion of the plurality of thin film integrated circuit devices;

introducing a gas or a liquid containing halogen fluoride into the groove, thereby removing the peel-off layer, thereby separating the plurality of thin film integrated circuit devices;

removing the jig attached to the plurality of thin film integrated circuit devices; and

forming an antenna on an upper or lower portion of the plurality of thin film integrated circuit devices.

14. A method for manufacturing a noncontact thin film integrated circuit device comprising the steps of:

forming a peel-off layer over a substrate;

forming a base film over the peel-off layer;

forming a plurality of thin film integrated circuit devices over the base film;

forming a groove at a boundary between the plurality of thin film integrated circuit devices;

introducing a gas or a liquid containing halogen fluoride into the groove, thereby removing the peel-off , thereby separating the plurality of thin film integrated circuit devices; and

enfolding at least one of the thin film integrated circuit devices with a substrate provided with an antenna.

15. A method for manufacturing a noncontact thin film integrated circuit device comprising the steps of:

forming a peel-off layer over a substrate;

forming a base film over the peel-off layer;

forming a plurality of thin film integrated circuit devices over the base film;

forming a groove at a boundary between the plurality of thin film integrated circuit devices;

attaching a jig to an upper portion of the plurality of thin film integrated circuit devices;

introducing a gas or a liquid containing halogen fluoride into the groove, thereby removing the peel-off layer, thereby separating the plurality of thin film integrated circuit devices;

removing the jig attached to the plurality of thin film integrated circuit devices; and

enfolding at least one of the thin film integrated circuit devices with a substrate provided with an antenna.

16. A method for manufacturing a noncontact thin film integrated circuit device according to Claims 13 or Claim 15, wherein the jig is attached using an adhesive material whose adhesive force is reduced or lost by UV light irradiation.

17. A method for manufacturing a noncontact thin film integrated circuit device according to Claim 12 or Claim 13, wherein the heat-resistant insulating film contains a material that has a skeletal structure including a bond of silicon and oxygen and includes at least hydrogen as a substituent or at least one selected from the group consisting of fluorine, an alkyl group, and aromatic hydrocarbon as the substituent.

18. A method for manufacturing a noncontact thin film integrated circuit device according to any one of Claims 12 through 15, wherein the peel-off layer contains silicon as a main component.

19. A method for manufacturing a noncontact thin film integrated circuit device according to any one of Claims 12 through 15, wherein the base film contains one selected from silicon oxide, silicon nitride, and silicon oxide containing nitrogen.

20. A method for manufacturing a noncontact thin film integrated circuit device according to any one of Claims 12 through 15, wherein the groove is formed by dicing or dry etching.

21. A method for manufacturing a noncontact thin film integrated circuit device according to any one of Claims 12 through 15, wherein the substrate is a glass substrate or a quartz substrate.

22. A method for manufacturing a noncontact thin film integrated circuit device according to any one of Claims 12 through 15, wherein the halogen fluoride is ClF_3 (chlorine trifluoride).

23. A noncontact thin film integrated circuit device comprising:

a thin film integrated circuit formed over a substrate with a base film interposed therebetween;

a heat-resistant insulating film formed over the thin film integrated circuit; and

an antenna formed over or under the thin film integrated circuit.

24. A noncontact thin film integrated circuit device comprising:

a thin film integrated circuit formed over a substrate with a base film interposed therebetween; and

a heat-resistant insulating film formed over the thin film integrated circuit;

a substrate provided with an antenna,

wherein the thin film integrated circuit is enfolded with the substrate and connected to the antenna.

25. A noncontact thin film integrated circuit device according to Claim 23 or Claim 24, wherein the antenna contains an element selected from the group consisting of Ag, Au, Al, Cu, Zn, Sn, Ni, Cr, Fe, Co, and Ti.

26. A noncontact thin film integrated circuit device according to Claim 23 or Claim 24, wherein the substrate is flexible.

27. A noncontact thin film integrated circuit device according to Claim 23 or Claim 24, wherein the heat-resistant insulating film contains a material that has a skeletal structure including a bond of silicon and oxygen and includes at least hydrogen as a substituent or at least one selected from the group consisting of fluorine, an alkyl group, and aromatic hydrocarbon as the substituent.

28. A noncontact ID tag including a noncontact thin film integrated circuit device according to Claim 23 or Claim 24.

29. A coin comprising a noncontact thin film integrated circuit device, the noncontact thin film integrated circuit device comprising:

a thin film integrated circuit formed over a substrate with a base film

interposed therebetween;

a heat-resistant film formed over the thin film integrated circuit; and

an antenna formed over or under the plurality of thin film integrated circuit,

wherein a part of components of the coin has a function of the antenna.

30. A coin according to Claim 29, wherein a material for the antenna or a component composing the coin contains an element selected from the group consisting of Ag, Au, Al, Cu, Zn, Sn, Ni, Cr, Fe, Co, and Ti.